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**RESISTANCE EXERCISING DEVICE****Field of Invention**

5        This invention relates to a resistance exercising device in particular, but not limited to a resistance bench.

**Background of Invention**

10        Health and fitness are of paramount importance to many people - young and old. Some of the most popular activities to improve physical fitness and health include walking, running, or some other lower body intensive activity. Although these activities improve cardiovascular fitness and exercise the lower body, they do not provide substantial exercise for the upper body.

15        Various exercise devices have been proposed that are intended as accessories in walking, jogging, resistance training or aerobics, and are well known in the prior art. Some of these devices rely on the user to provide resistance. There are known workout devices which impart resistance to the user. Some of these devices have rotatable pulleys having a length of cord operatively wound thereabout and provide the necessary resistance  
20        to unwind the exercise cord by either establishing a compressive force against the cord itself or by winding the cord about one or a series of capstands. Such structural limitations give rise to various operational limitations and further cause the exercise cord to wear excessively during the use of the exercise device, thus reducing the efficiency and life of the exercise device. Other devices rely on cables and pulleys to provide a frictional  
25        force against a pulley or cable spool to impart resistance against the rotational movement of the pulley by a flexible cord or cable. Other devices impart a biasing resistance to the pulley or spool by the action of a spiral coiled spring.

Generally the above known devices are limited to the type of exercise that they can provide and are limited to targeting only a certain part (or parts) of the body. Also the

known devices are usually cumbersome to use and take up a lot of floor space and are not easily portable. Another disadvantage is that some of the known devices can allow "cheating" (a common phrase used in muscle-fitness exercising). Traditional "cheating" is performed by using body momentum to counterswing the forces of resistance back to a manageable level for the person exercising and it can lead to a less effective workout being achieved.

### **Object of the Invention**

It is an object of the invention to provide a resistance exercising device that seeks to ameliorate some of the disadvantages and limitations of the known art or at least provide the public with a useful choice and that in the entire configuration of the device in a working state there exists an exercising device that is unique as an addition to the prior art.

### **Statement of the Invention**

In a first aspect the invention resides in a resistance exercising device, typically a resistance bench, for body fitness and weight training exercises including a housing, at least one biasing means, at least one internal cable, at least one pulley, at least one external cable and gripping means, wherein

- i. said biasing means is adapted to be connected to an internal side wall of the housing,
- ii. said pulley is adapted to be rotatably fixed to a side wall of the housing opposite to the internal side wall the biasing means is connected,
- iii. said biasing means and said pulley are adapted to be connected to one another by said internal cable that is adapted to be wound onto and unwound from said pulley,
- iv. said pulley is adapted to be connected to one end of said external cable that is

adapted to be wound onto and unwound from said pulley, and

- v. said gripping means are adapted to be gripped by the hands or feet/legs of a user and are adapted to be connected to the other end of said external cable,

wherein in use as a user extends said gripping means away from the resistance

- 5 exercising device said external cable is unwound from said pulley causing said internal cable to wind onto said pulley and to cause biasing means to extend against the bias of the biasing means such that the greater the distance the biasing means extends the greater the resistance applied to the user and such that as user releases said gripping means said external cable is wound onto said pulley and said internal cable is unwound from said
- 10 pulley under the action from the biasing means.

Preferably the biasing means is a spring mechanism, preferably a closed spring mechanism.

- 15 Preferably the biasing means is an elastically stretchable material or any other suitable resistance element adapted to apply a resistive force when stretched.

- Preferably within the housing there are multiple biasing means connected to the internal side wall and connected to the internal cable via a metal rod with releasable
- 20 fasteners attached.

- Preferably there is a further pulley rotatably fixed to the housing wall adjacent to said pulley, wherein the further pulley is connected to another biasing means connected to an internal side wall of the housing by a further internal cable and a further metal rod, and
- 25 the further pulley connected to a further external cable having hand/leg holding means.

Preferably an outer surface of the housing is upholstered or covered typically with a padded vinyl material or with a suitable similar material.

Preferably the housing has a seat portion which may be opened to allow access to a storage area, and adjustable legs to allow the resistance exercising device to be positioned on the floor.

- 5            Preferably the legs can be extended from a position flush with the side external walls of the housing to a fully extended position.

Preferably the device may have additional support levers extending to add support to a backrest.

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Preferably the backrest may return to rest on the adjacent face to which the seat is positioned on the housing.

Preferably the outer surface of the seat portion is upholstered.

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Preferably the resistance exercising device is portable.

Preferably the resistance exercising device is made from lightweight durable materials, typically lightweight metals and/or plastics such that the resistance exercising device can be easily lifted and used in any exercising position.

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Preferably the pulley has a first hub to which the internal cable is connected and a second hub to which the external cable is connected.

- 25            Preferably the second hub of the so named hub/pulley has a greater diameter than the first hub of the said hub/pulley.

Preferably the hub/pulley or pulley has a first to second hub ratio of 3:1.

Preferably the biasing means is connected to the internal side wall and to the internal cable by releasable fasteners.

5      Preferably the gripping means are connected to the external cable by releasable fasteners.

Preferably the metal rod is stabilised by attachment to rotating chains on sprockets attached to the side internal walls of the device.

10      Preferably a rotating chain on sprockets is connected to the adjacent rotating chain on sprockets by an axle which ensures spontaneous rotation of both axle joined sprockets and thence concurrent movement of adjacent rotating chains.

15      Preferably the gripping means have moulded hand/leg grips.

Preferably the housing has a door which allows access to the interior of the housing to enable adjustment of several biasing means.

20      Preferably the housing has handles attached thereto to allow for easy transportation thereof.

Preferably another external cable can be attached to said external cable to lengthen it.

25      Preferably the external cable can be fastened at its gripping means end to the second hub of the hub/pulley with a clip.

Preferably the housing has a back support attached wherein the back-support can be adjusted to a plurality of positions.

Preferably an outer surface of the back support is upholstered.

Preferably the gripping means are ankle straps adapted to allow the external cable to be pulled by the ankle of a user.

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Preferably the housing is fitted with wheels adapted to allow the housing to move so that additional exercises can be performed as the housing moves relative to the surface it is situated.

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Any other aspect herein described.

### **Brief Description of the Drawings**

In order that the present invention be better understood and put into practical effect, reference will now be made to the accompanying illustrations wherein:

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Figure 1 shows the invention from a side view perspective, whilst at rest;

Figure 2 shows the invention from a bottom view perspective, whilst at rest;

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Figure 3 shows the invention from a bottom view perspective, whilst in operation, with all four handles 1 being attached;

Figure 4 shows the invention from an end view perspective, whilst at rest, with legs extended and back support unextended.

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### **Detailed Description of the Drawings**

The device is a self-contained system for use in a comprehensive range of body-fitness and weight training exercises.

This invention provides an enclosed rectangular prism like space containing specialised hub-pulleys or pulleys, cables, springs or biasing means, spring housings or sheaths, fasteners, rubbers, metal rods, chains, sprockets, axles, and spare hand/foot handles or gripping means. Externally, it has attachable hand/foot handles or gripping means, fasteners, clips, cables, upholstered seat and upholstered adjustable backrest, adjustable/retractable legs and wheels being countersunk into the housing though protruding externally.

There are preferably at least two springs internally. These are closed springs (i.e. the coils of each individual spring are touching each other until they are pulled apart). These springs are attached to the internal walls of the device with mountings. The other end of the springs are attached with releasable fasteners to a metal rod which is attached to an internal cable, which in turn, are attached to the smallest hub of a 3:1 (or otherwise) ratio hub-pulley. There are external cables attached to the two larger hubs of each hub-pulley. There are gripping means attached to these external cables. The metal rods are internally connected to chains which are held moveably by sprockets, for each chain-sprocket combination there is an axle connecting each chain-sprocket combination to its adjacent chain-sprocket combination.

Referring to Figure 1, it can be seen that the resistance exercising device according to this invention comprises a rectangular metal casing 9 composed of shaped metal having mountings 8 fastening in place spring tubular casings 7 which may be made of a plastic composite material or otherwise and hold springs or biasing means 6 in place. These casings allow the springs 6 that are not in use to be held still. A hand/foot handle or gripping means that is not in use may be stored in storage space 24.

Referring to Figure 2, one end of the biasing means or springs 6 may be attached to the same mountings 8 as the spring tubular casings or sheaths 7. The biasing means 6 can be attached or unattached to hook fasteners 15 which may be permanently attached to

metal rod 14, this allows one or more biasing means 6 to be engaged in the operation of the device. The metal rod 14 is attached to the internal cable 5 which is pulled by the turning of the internal/external hub 4, which is turned by the attached outer drum 3 as the external cable 2 is pulled by the gripping means 1. The ends of the metal rod 14 are  
5 attached to moveable chains 18 which sit upon sprockets 19 which are fastened to metal casing 9 and to an adjacent sprocket 19 via an axle 20. This ensures the metal rod 14 remains perpendicular to the side walls of the device whilst it is in operation.

Referring to Figures 2 and 3, it should be realised that all of the parts mentioned are  
10 duplicated at the adjacent end of the resistance exercising device, allowing gripping means 1 to be manipulated from each end of the said device, and a general layout for achieving this harmonising of adjacent parts can be observed in Figure 1.

Referring to Figure 3, the resistance exercising device can be seen at full mechanical  
15 extension, with one spring 6 in use. Several springs 6 may be used, corresponding to the number of springs 6 being coupled to the hook fasteners 15. With each added biasing means 6 increased resistance will be achieved. If at a particular end of the device one of the external cables 2 is not attached to one of the gripping means 1 it may be fastened to the corresponding outer drum 3 via a clip 22.

Referring to Figure 4, it is shown how at an end of the device a gripping means 1  
20 that is not in use can be detached at attachment clips 16 and fastened to metal casing 9 with storing clips 17, this view also gives an end view of the device showing wheels 21 that are of use when performing particular exercises without the legs 13 being extended.

25 It will be realised that the resistance exercising device as an invention is not restricted to the use of a very narrow range of materials, there being several materials that may be used, and for the fasteners, clips and mountings any number of suitable, appropriate and efficient types of design may be used.



It will also be realised that there are a number of ways in which the device may be bolstered to allow easily applied added resistance. One example being the adding of half-inch (or otherwise) diameter rubber loops or bands, extending from the mountings 8 toward and attached to the hook fasteners 15.

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The process by which this invention works as used by a person is described as follows:

A person places the resistance exercising device in the appropriate place on their  
10 body to enable a particular specialised exercise to be performed by pulling on the cables to an extended or part thereof position. This process extends the springs up to and including the point of being fully opened to the extent that the device will allow. By using a 3:1 (or similar) ratio hub-pulley, a spring of very great strength can be used to allow a long  
15 extension of the cables, with a lesser extending of the springs relative to the extending of the cables. More than one spring on each internal end can be used, and utilising fasteners to be attached to one or multiple springs allows increasing resistance to be easily applied by internal adjustment between repetitions of exercises. Rubbers can also be attached to the fasteners to increase the resistance of the mechanical process.

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This device may be utilised by a person to perform a range of exercises in excess of that which is reasonably or effectively feasible on a standard weight bench (using free weights), as it does not merely sit on the floor with the option to incline half of it. It can be positioned appropriately for many exercises, anywhere on the human body, as well as locations separate to the human body. It does not rely upon gravity to create resistance,  
25 and does not rely upon heavy weights. It is lightweight, is minimally bulky and of a relatively small useable size.

This invention is portable, and conveniently so when compared to the prior art. It folds from a compact suitcase-like size into an adequately sized bench. It can be used merely as a seat whilst between exercises, and may be equipped with a backrest.

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### **Advantages**

This device has a significant advantage in its use, over the use of free weights or hydraulics in a very important and significant respect. This is that there is an increase in resistance toward the full extension of the repetition due to the use of springs, rubbers and named hub-pulleys. The human arm, leg and body are effectively stronger the nearer they are to being fully extended, and this device allows greater resistance at these crucial sections of an exercise. Another advantage of this invention is that it utilises the body of the person exercising to anchor it whilst performing an exercise - anchoring the device even more solidly into its necessary and appropriate position. This device discourages traditional "cheating" (a common phrase used in muscle-fitness exercising), as the person exercising makes up a supporting part of the devices action. Traditional "cheating" is performed by using body momentum to counterswing the forces of resistance back to a manageable level for the person exercising - and it can lead to a less effective workout being achieved. This device is much less prone to this manipulation as the manipulation will be felt directly at the anchor point for an exercise and will be transferred as increased resistance at the cable handles, this will not create inappropriate strain on the body in the way that free weights or others can when they are used on a stationary weight bench.

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### **Variations**

It will of course be realised that while the foregoing has been given by way of illustrative example of this invention, all such and other modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as is herein set forth.

Throughout the description and claims of this specification the interchanging of descriptive names of elements of the device is to allow scope for small variations which may be appropriate for individual differing versions of the device and to allow for the possibility of there being in some instances a "grey area" as to the final and accepted name of a particular mechanical element. The use of the word "compromise" and variations of that word such as "compromises" and "compromising", are not intended to exclude other additives, components, integers or steps.